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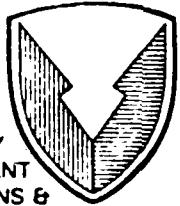
HAZARDS CLASSIFICATION OF MTSQ FUZE M582A1  
IN AMMUNITION BOX

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Project Engineer  
ARDEC



US ARMY  
ARMAMENT  
MUNITIONS &  
CHEMICAL COMMAND  
ARMAMENT RDE CENTER

U.S. ARMY ARMAMENT RESEARCH, DEVELOPMENT AND ENGINEERING CENTER

SAFETY OFFICE

DOVER, NEW JERSEY

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27 10 1987

## UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The MTSQ fuze M582A1 in a non-propagating shipping container was tested in accordance with the DoD Explosive Hazard Classification Procedures. In the single package test, there was no detonation of total contents. There was no propagation between fuzes in the container. In the external fire stack test, there was no mass explosion. Based on interpretation of results, a probable Division (1.4) (DOT Class C) classification was indicated for the fuze in a non-propagating shipping container.		

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## INTRODUCTION

A series of tests were conducted for the U.S. Army Armament, Munitions and Chemical Command, Safety Office, Dover, NJ 07801, to provide data for the hazards classification of Fuze, MTSQ, M582A1, packaged in ammunition box. The testing involved the conduct of three single package tests and a single external fire stack test, which were conducted in accordance with Army TB 700-2 "Department Of Defense Explosives Hazard Classification Procedures", September 1982. The procedures, details and results of this test series are described in this report.

## DISCUSSION

### TEST HARDWARE

The test hardware consisted of a total of 64 Fuze MTSQ M582A1 packaged eight (8) to a M2A1 Ammo Box. See Figures 1 to 10 for fuze explosive train drawings and Figure 11 for the Ammo Data Card. Details of the Ammo Box and non-propagation packaging are shown in Figures 12 to 19.

The rear end of each fuze was supported by a heavy wall cardboard tube. This system provided an air space plus approximately 1/2 inch of cardboard material between adjacent boosters.

The booster had a metal casing and was loaded with 23.2 grams Comp A-5 (97% RDX).

### SINGLE PACKAGE TESTS

Three ammunition boxes each containing eight fuzes and internal packaging were used in the conduct of three single package tests (1 box with 8 fuzes per test).

Initiation of one of the interior fuzes was accomplished in two ways. In test 221 the booster was removed from the fuze. The fuze was replaced with a wooden mockup which had the same external geometry as the fuze. The booster was initiated by means of a Reynolds Industries RP-87 exploding bridge wire (EBW) detonator, which has an output charge consisting of 47 MG RDX plus a MK9 lead containing 363 MG of CH-6. In tests 222 and 224 the booster was unscrewed from the fuze and the RP-87/MK 9 were placed on their side sandwiched between the fuze and booster. The initiation geometries are depicted in Figure 20.

Each test was conducted with confinement provided on all sides of the ammunition box. The confinement was provided by burying the boxes in soil such that the top was flush with the ground. A hole was dug in the ground and a piece of plywood 5/8 X 12 X 12 inches placed in the bottom of the hole. The box was placed directly on top of the plywood and soil was compacted around the box sides and ends. Top confinement varied. In test 221 a 0.25 X 24 X 36 inch armor plate was placed on top of the ammo box and was covered with a single sand bag. In test 222 the armor plate plus three sandbags were used. In test 224 seven sandbags (no steel plate) were used.

A closed circuit TV system was used to observe each test. After booster initiation the test area was kept clear for 1/2 hour. Following the 1/2 hour waiting period the site was visually inspected and the results documented by note taking and photographs.

In test 221 the armor plate and sandbag were thrown clear of the ammo box and the box itself and fuzes were ejected from the pit. Several of the cardboard packing tubes were observed to smolder for approximately 20 minutes following detonation of the booster. Only the initiated booster fired high order as determined by the large circular hole made in the box bottom. All seven remaining fuzes remained integral. Three of the attached boosters were substantially deformed (crushed in approximately 1/4 inch) on the side facing the initiated booster.

In test 222 the ammo box and several of the fuzes remained in the pit, apparently due to the increased confinement. Only the initiated booster fired high order as determined by the large circular hole made in the box bottom. The other seven fuzes did not initiate. Boosters were crushed and separated from three of these fuzes. Two of the booster cups retained the Comp A-5 explosive while the third was emptied.

In test 224 the ammo box and several of the fuzes remained in the pit, apparently due to the increased confinement. Only the initiated booster fired high order as determined by the large circular hole made in the box bottom. The other seven fuzes did not initiate. The boosters were crushed and separated from three of these fuzes (similar to test 222).

Selected photographs of the test assembly and post test views are contained in Figures 21 to 27

#### EXTERNAL FIRE STACK TEST

Five ammunition boxes each containing eight fuzes and internal packaging were used in the conduct of the external fire stack test. The five boxes were banded together using steel strapping. The five box assembly was in turn banded to a steel burn test fixture.

Three insulation board fragment recovery packs, each containing 48 - 1/2 X 48 X 96 inch panels were set up with the 8 ft. dimension vertical and the 4 ft. dimension perpendicular to a nominal fragment line of flight.(See Figure 28)

Combustible material consisting of one inch pine boards (broken up scrap wooden ammunition boxes) was placed so as to completely fill the space under the 50 inch square X 55 1/2 inch high steel burn fixture frame work. Additional boards were placed around and on top of the ammunition boxes. The wood was soaked with 15 gallons of No. 2 fuel oil. The fire was ignited remotely by means of two igniters consisting of an electric match, an ignition mix of black powder and BK NO<sub>3</sub>, and a booster mix of M30 propellant.

The test was observed and recorded using a CCTV system. A microphone was placed approximately 50 ft. from the test fixture and was utilized to monitor detonations or deflagrations which provided a substantial audible report. The microphone outputs were recorded on the video tape. The test was conducted in the afternoon and the area was kept clear of personnel until the following morning. Test results were evaluated from the video tape, by inspection of the test site (fuzes, fuze debris and ammunition box debris on the ground) and by recovery of metal fragments from one of the recovery packs. Documentary photographs were obtained. Two of the three fragment recovery packs burned and no fragments were recovered from these packs.

A study of the video tape, with superimposed audio, indicated a total of 16 discrete audible events (detonation or deflagration). After ignition the fire burned for seven minutes before any of the fuzes produced audible cookoff. In the next minute there were eleven discrete audible reports.

At seven minutes there was a loud audible report and explosion from the stack. This was shortly followed by three reports which were audible but of substantially less amplitude (one from the stack and two from the base of the fire). Over the remainder of the minute there were three lower amplitude reports (one from the stack and two from the base of the fire) and three more loud reports (one from the stack and two from the base of the fire). Near the eight minute point there was a very loud report and visually violent explosion which scattered a lot of material. Judging from the violence of this event there was a multiple reaction of boosters. Following this event there was no remaining material atop the burn fixture. There were four additional reports from the base of the fire over the next four minutes (two loud and two lower amplitude). Thirty four minutes after fire ignition another fuze was cooked off (lower amplitude) by a fire produced by burning of one of the insulation board recovery packs.

The day following the test the ground area out to a radius of approximately 300 ft. was searched for debris. Fuze debris and ammunition box pieces were found as far as 265 ft. from the burn fixture. Figure 29 is a map showing the location of some of the principal debris recovered.

Of the 40 fuzes tested, parts of 33 were recovered. Five were recovered with booster attached. The plastic windows over the time delay indicator were melted. An additional 12 were recovered intact less booster (also with melted window). Sixteen fuze internal components were recovered. These had been damaged similar to the ones which fired high order in single stack tests 221, 222 and 224. Also seven booster cups were found with no Comp A-5 load.

A total of eight fragments were recovered from the westerly insulation board recovery pack. The front panel captured five fragments which are apparently all from fuze debris (two aluminum and three steel). The second panel captured three fragments which are also apparently from fuze debris and are all steel. Individual fragment weights are listed in Table I. The recovery pack face represents a solid area of .1107 steradians.

Examination of the steel burn fixture indicates that at least three high order reactions (explosions) occurred within the stack, two of which appeared to be single booster detonations. These explosions both produced substantial localized single dents in the two inch pipe supports. The third explosion produced bowing of two adjacent pipes but no distinct localized dents. This could have been caused by detonation or deflagration of one or more boosters within the center of an ammo box.

Selected photographs of the test setup and post test views are contained in Figures 30 to 37.

## RESULTS

### SINGLE PACKAGE TESTS

In the three single package tests high order detonation of the initiated booster was achieved but none of the other fuzes in the box reacted either high or low order. In each test all seven fuzes and boosters were recovered. The boosters nearest to the initiated booster were severely crushed and in some cases separated from the fuze body.

### EXTERNAL FIRE STACK TEST

Five metal ammo boxes each containing eight M582A1 fuzes were strapped together and exposed to a hot wood/fuel oil fire. A total of 16 discrete explosions were observed. Of these, five emanated from the stack. The remainder came from the base of the fire, apparently resulting from fuzes falling into the fire when the ammunition boxes ruptured.

Two of the explosions within the stack were apparently high order detonations of single boosters, as the noise level was similar to that observed from a single package test. This was also indicated by the effect on the steel burn fixture. Each of these detonations would have caused rupture of an ammo box and dispersion of at least a box full of fuzes.

One of the explosions was substantially more violent both audibly and visually. This was apparently a multiple detonation within a box. Examination of the burn fixture indicated that three substantial explosions occurred (two apparently from single booster detonations). In the third explosion the number of boosters which detonated cannot be determined (could be one or more).

The NATO ammunition data card is contained on the following page.

AC/268

**NATO DATA CARD**  
**AMMUNITION CLASSIFICATION TEST RESULTS**

**1. SECURITY CLASSIFICATION:**  
UNCLASSIFIED

<b>2. TESTING NATION:</b>		<b>6. ADDRESS OF NATIONAL TESTING AUTHORITY:</b> DIRECTOR USA AMC FIELD SAFETY ACTIVITY ATTN: AMKOS-SE CHARLESTOWN, IN 47111-9669		<b>2. NATO TEST REFERENCE:</b>	
<b>4. TESTING SERVICES AND REFERENCE:</b>					
<b>8. NATO STOCK NUMBER:</b> 1390-01-158-8193 N286	<b>7. CALIBRE OR WEIGHT:</b> 20.775Kg (45.8 lbs)	<b>8. ITEM NAME AND MODEL DESIGNATION:</b> Fuze MTSQ M582A1			

**2. TYPE OF PACKAGE AND PACKING MATERIALS:**

M2A1 Ammunition Box with Tubes for Non Propagating Packaging

<b>9. GROSS WEIGHT OF ITEM (ROUND, BOMB, ETC) KG 20.775 Kg</b>	<b>11. NUMBER OF ITEMS IN EACH PACK 8 per metal box 16 per wire-bound box (45.8 lbs)</b>	<b>12. GROSS WEIGHT OF PACK KG 9.89 Kg (21.8 lbs)</b>	<b>13. TYPES OF EXPLOSIVE</b> (a) BURSTING CHARGES (b) PROPELLANT (c) OTHER EXPLOSIVES	<b>14. TOTAL QUANTITY</b> ..... ..... .0239 Kg	<b>15. NET QUANTITY FOR COMPUTATION OF QD .0239 Kg.</b>
<b>6. HAZARD DIVISION:</b> 1.4	<b>16. UN SERIAL NO:</b> 0410	<b>19. AUTHORITY AND DATE:</b> a. TB 700-2 b. LETTER, DRCSF, SUBJECT: COORDINATION AND APPROVAL OF HAZARD CLASSIFICATION, 6 AUG 81 c.			
<b>7. COMPATIBILITY GROUP:</b> D					

**20. SINGLE PACKAGE DETONATION TEST RESULTS**

**FIRST TEST :** No Detonation of total contents  
No propagation between Fuzes in the container.

**SECOND TEST:** No Detonation of total contents.  
No propagation between Fuzes in the container.

**THIRD TEST :** No Detonation of total contents.  
No propagation between Fuzes in the container.

**21. STACK DETONATION TEST RESULTS****NUMBER OF PACKAGES IN TEST:**

**FIRST TEST :** Tests not performed

**SECOND TEST:**

**THIRD TEST :**

**22. STACK FIRE TEST RESULTS****NUMBER OF PACKAGES IN TEST:**

First reaction occurred 7 minutes after initiation of fire stack. Sporadic eruptions with an audible report continued for approximately 34 minutes. There was no mass detonation of total contents. Maximum debris distance (no hazardous fragments) was 265 feet.

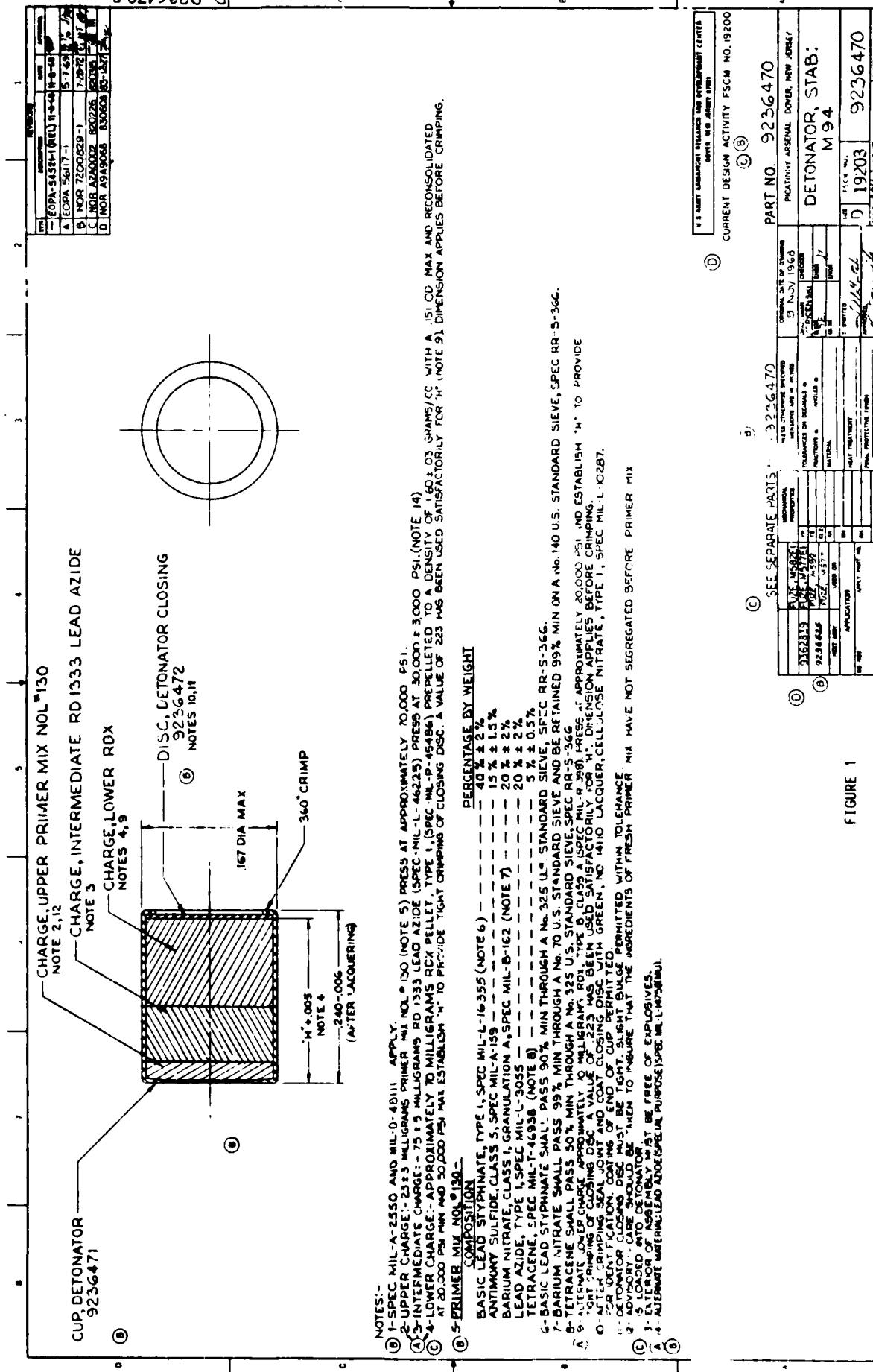
**23. REMARKS:**

TABLE I

FRAGMENTS RECOVERED FROM WESTERLY PACK

FRAGMENT WEIGHT (GRAMS)

<u>LAYER 1</u>	<u>LAYER 2</u>
.26	1.26
.10	.20
.09	.17
.03	
.02	



111

APPLICATION		REVISIONS			
NEXT ASSY	USED ON	SYM	DESCRIPTION	DATE	APPROVAL
		-	PRODUCTION RELEASE ERR A9A9068 830608 (FCP A3A2070 831101)	83-12-27	F. E.C.
NATIONAL STOCK NO.	COMBINATION OF ADOPTED ITEMS				DWG OR PART NO.
1390-01-158-8193 N286	16-FUZE, MTSQ, M582EI 16-TUBE 2-SUPPORT, TOP  2-BOX, AMMUNITION, M2AI 1-BOX, WIREBOUND				9352383 9328329 9232149  7553296 8861213

► NOTES:

- 1-INNER PACKAGING-8 FUZES PER M2AI METAL BOX,  
PACKAGED IN ACCORDANCE WITH DWG.8864492.
- 2-OUTER PACKAGING-2 M2AI BOXES (16 FUZES) IN A  
WOOD WIREBOUND BOX, PACKAGED IN ACCORDANCE  
WITH DWG.8861213.

**PART NO.9362795**

ORIGINAL DATE OF DRAWING 83-12-27	U S ARMY ARMAMENT RESEARCH AND DEVELOPMENT CENTER D'VER, NEW JERSEY 07801		
DRAFTSMAN JS	COMBINATION OF ADOPTED ITEMS		
ENGR	FOR: FUZE, MECHANICAL TIME AND		
ENGR	SUPERQUICK, M582EI		
<i>James F. Reale</i>	SIZE A	FSCM NO. 19200	9362795
<i>Edmund J. Cheeky</i>	SCALE -	UNIT WT	SHEET

NOTES: -  
1. SPEC. MIL-A-2520 AND MIL-F-4606 (FA) APPLY.  
2. APPLY ADDRESSIVE DING 92367600 R ADHESIVE SEALANT, SILICONE RTV, GENERAL PURPOSE,  
OER MIL-A-6560, TYPE I, COLOR WHITE, TO BLACK AFD THREADS, SEC. AND ASSEMBLE INCASTER  
TUBE. ADHESIVE IS WE.  
3. BCASTER TUBE WITHIN AND C/ASSEMBLY TORQUE OF 35 INCH POSES MINIMUM.  
4. MARK WITH STENCIL, CAPITAL LETTERS, TYPE 100, 1/8" HIGH, AND DATE-loaded, MONTH AND YEAR.  
5. USING INK, STENCIL, WHITE MIL-SPEC 17752, TYPE I OR SPEC IT-17752.

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FUZE, MECHANICAL TIME AND SUPERQUICK, M582E1  
LESS BOOSTER 9352382

CUP BOOSTER 8595609  
Note ✓

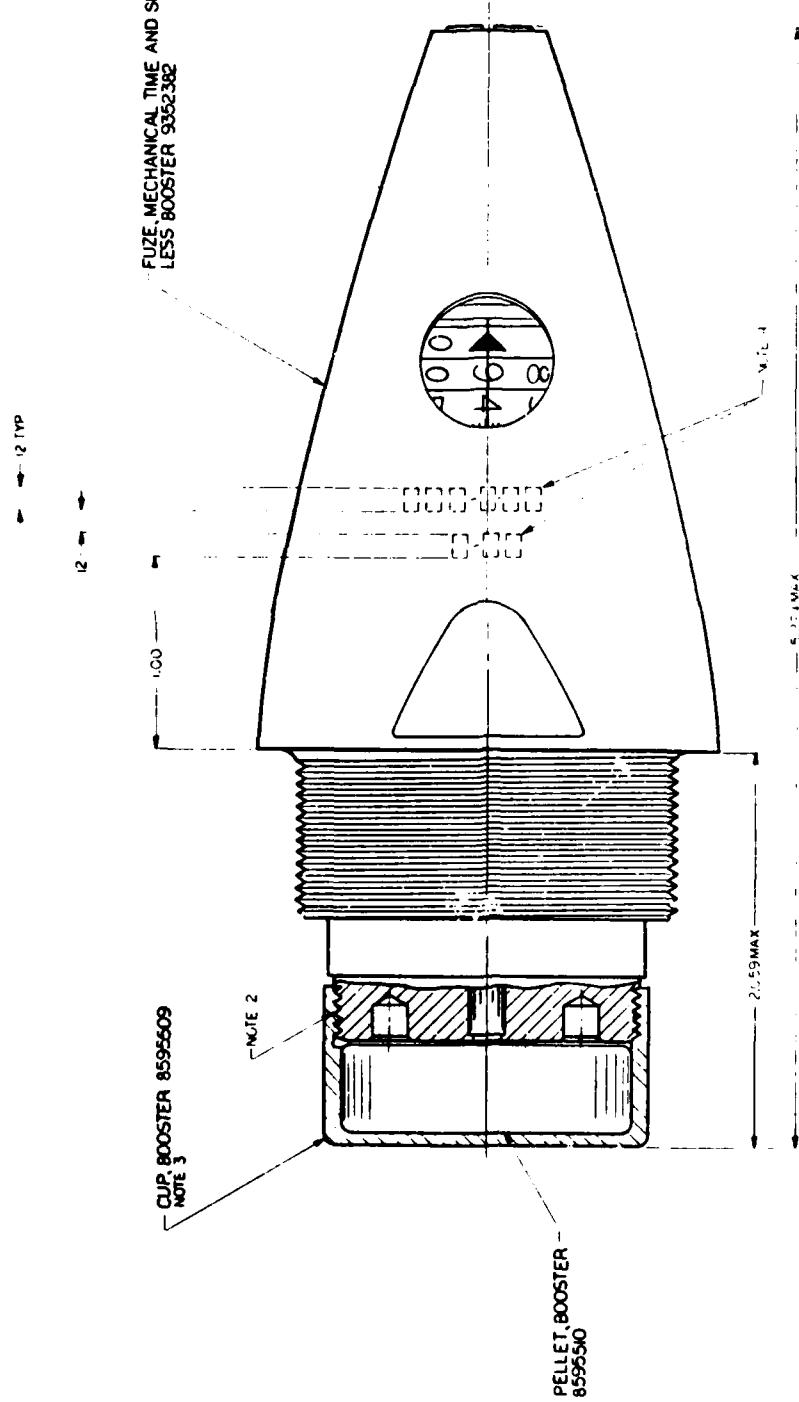
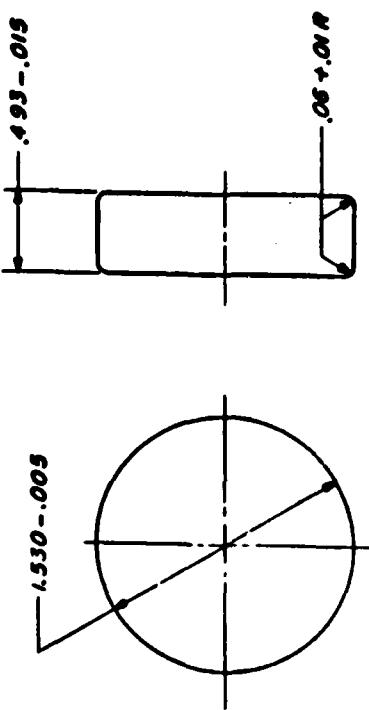


FIGURE 3



**NOTE:**

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-A-2930 AND ALL DOCUMENTS CONTAINED THEREIN.
2. MATERIAL - PELLET RDY. TYPE IIIA, SPEC. MIL-P-45486.
3. PELLETIZE AS SHOWN WITH 23.284 ± 1.020 GM'S.
4. ALTERNATIVE METHOD OF MANUFACTURE - PERMIT .06+.01 R ON ONLY ONE SIDE OF BOOSTER PELLET. ALTERNATIVE IS PERMISSIBLE ONLY WHERE ADEQUATE CONTROLS FOR PROPER ASSEMBLY ARE APPLIED.
5. A PELLET WHICH FAILS TO MEET THE WEIGHT REQUIREMENT BE A NOTE 3 BUT MEETS THE DIMENSIONAL REQUIREMENTS SHALL BE ACCEPTABLE PROVIDED THE DENSITY OF THE PELLET IS BETWEEN 1.50 AND 1.70 GM/CC.
6. ADVISORY - THE FACE OF PUNCHES USED TO CONSOLIDATE COMP A-5 SHOULD HAVE A FOUR (4) MICRO FINISH MIN. TO PREVENT STICKING.
7. ADVISORY - IF THE COMP A-5 AS RECEIVED, HAS A SPREAD IN THE BULK DENSITY GREATER THAN 2.025 GM/ML, BLEND THE COMP A-5 TO OBTAIN A HOMOGENEOUS MIXTURE. A BLENDING TIME OF APPROXIMATELY 30 MINUTES HAS BEEN FOUND ACCEPTABLE WHEN USING A 300 POUND CAPACITY, BAFFLELESS, GEMCO BLENDER REVOLVING AT APPROXIMATELY 32 RPM.

1	1	1
2	2	2
3	3	3
4	4	4

.95-.015

.06+.01R

1.530-.005

**NOTE:**

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-A-2930 AND ALL DOCUMENTS CONTAINED THEREIN.
2. MATERIAL - PELLET RDY. TYPE IIIA, SPEC. MIL-P-45486.
3. PELLETIZE AS SHOWN WITH 23.284 ± 1.020 GM'S.
4. ALTERNATIVE METHOD OF MANUFACTURE - PERMIT .06+.01 R ON ONLY ONE SIDE OF BOOSTER PELLET. ALTERNATIVE IS PERMISSIBLE ONLY WHERE ADEQUATE CONTROLS FOR PROPER ASSEMBLY ARE APPLIED.
5. A PELLET WHICH FAILS TO MEET THE WEIGHT REQUIREMENT BE A NOTE 3 BUT MEETS THE DIMENSIONAL REQUIREMENTS SHALL BE ACCEPTABLE PROVIDED THE DENSITY OF THE PELLET IS BETWEEN 1.50 AND 1.70 GM/CC.
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EXPLOSIVES HAZARD CLASSIFICATION CLASS 3  
STORAGE COMPATIBILITY GROUP B  
DEPARTMENT OF TRANSPORTATION (DOT)  
HAZARD CLASS A DOT MARKINGS BOOSTERS  
(EXPLOSIVES) HANDLE CAREFULLY.

PART No. 8595510

1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5

U.S. ARMY  
MANUFACTURER: AMMUNITION  
MANUFACTURING CO.  
PHILADELPHIA, PA. 19137

PELLET BOOSTER

DATE OCT 21, 1999

WEIGHT  
IN gm

SEE NOTE

QTY  
IN gm

DATE 21 Oct 1999

WEIGHT  
IN gm

SEE NOTE

QTY  
IN gm

DATE 21 Oct 1999

WEIGHT  
IN gm

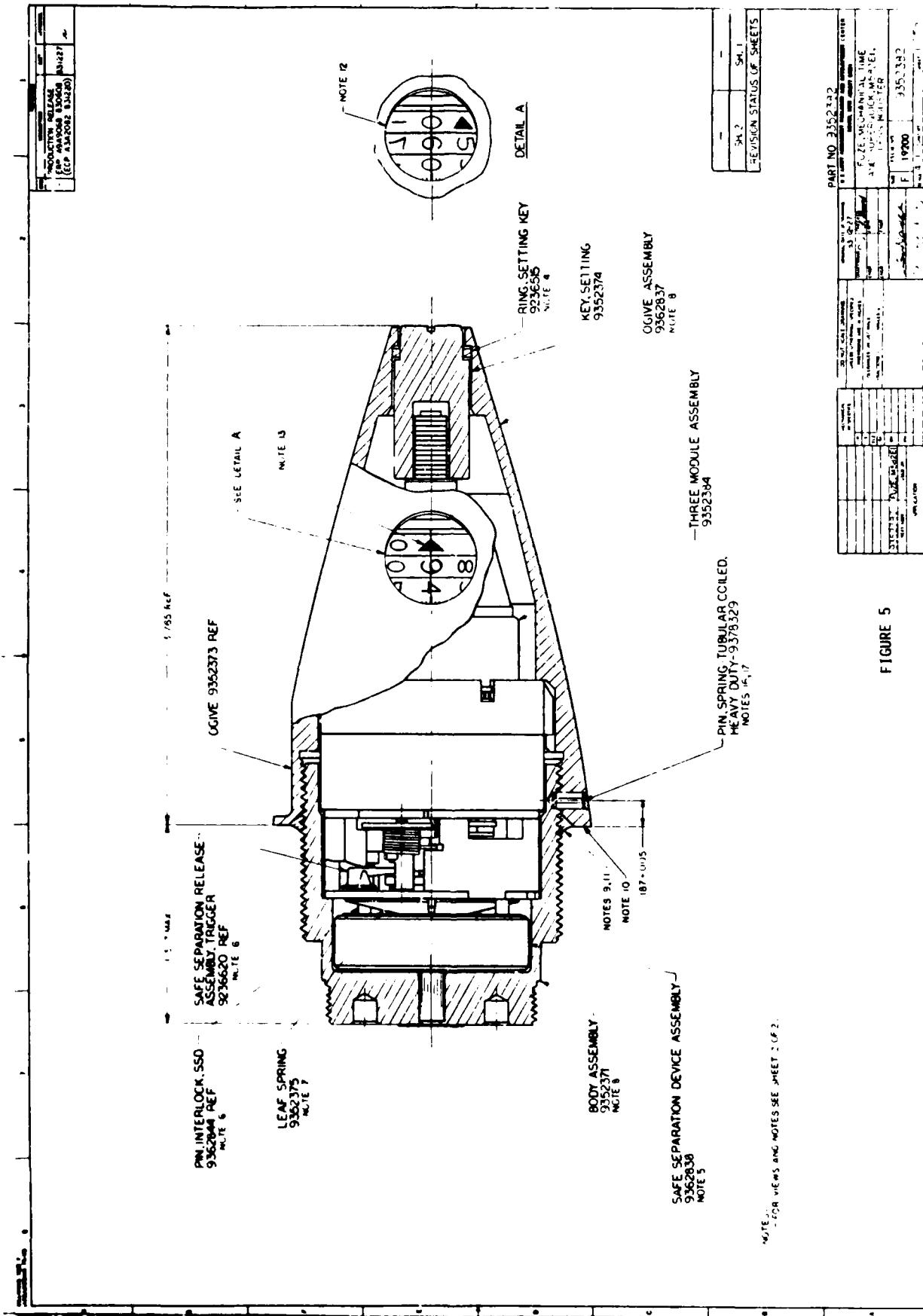
SEE NOTE

QTY  
IN gm

DATE 21 Oct 1999

WEIGHT  
IN gm

FIGURE 4



NOTES:

1. SPEC MIL-A-2950 AND MIL-F-64042 APPLY.
2. SPECIFICATION WITH TESTS (PERFORMANCE AND LABORATORY) REQUIRED BY THE SPECIFICATION AND DRAWINGS IS MANDATORY. THE CONTRACTOR WILL NOT ASSUME NOR DOES THE GOVERNMENT GUARANTEE THAT ALL POSSIBLE COMBINATIONS PERMITTED BY THE TOLERANCE LIMITS OF THE SPECIFICATIONS AND DRAWINGS WILL CONSISTENTLY SATISFY THE TEST REQUIREMENTS. THEREFORE, THE MANUFACTURER IS OBLIGATED TO CHOOSE THE COMBINATIONS OF TOLERANCES AND FITS THAT MEET THE LIMITS OF THE SPECIFICATION AND DRAWINGS THAT BEST SUIT HIS PROCESS NEEDS AND STILL SATISFY THE TESTING REQUIREMENTS.
3. THE AXIAL RELATIONSHIP OF THE PARTS ILLUSTRATED IS FOR REPRESENTATION ONLY AND IS NOT NECESSARILY TRUE ORIENTATION.
4. APPLY GREASE DWG. 9236520 OVER ENTIRE SURFACE OF PIN, SETTING KEY.
5. PRIOR TO ASSEMBLY, SAFE SEPARATION DEVICE ASSEMBLY MUST BE IN THE SAFE POSITION WITH DETENTS ENGAGING THE ROTOR
6. PIN INTERLOCK, SSD MUST ENGAGE SAFE SEPARATION RELEASE ASSEMBLY, TRIGGER.
7. ASSEMBLE LEAF SPRING, ONLY IN ORIENTATION SHOWN.
8. TIGHTEN BODY ASSEMBLY TO GIVIE ASSEMBLY WITH A TORQUE OF 450-10.0 FOOT POUNDS. (RIGHT HAND THREAD REFL.
9. AFTER ASSEMBLY, APPLY SEALANT ADHESIVE DWG. 9236716 IN THE GROOVE CREATED BY THE CHAMFER. ADVISORY PROCEDURES FOR SEALANT APPLICATION ARE PROVIDED BY DWG. NO. 9236737.
10. NO ADHESIVE IS PERMISSIBLE ON THIS FLAT END SURFACE OF THE OGIVE BEYOND OGIVE ASSEMBLY TO BODY ASSEMBLY MORE THAN ONE THREAD.
11. NO ADHESIVE IS PERMISSIBLE ON BODY ASSEMBLY MORE THAN ONE THREAD.
12. AFTER THE REQUIREMENT OF NOTE 8 IS MET, SET FUZE TO 1.00 SECONDS BY APPLYING POSITIVE SETTING TORQUE (COUNTER CLOCKWISE) 1. WHEN TORQUE IS REMOVED THE COUNTER SHALL READ 90 SECONDS WHEN READ TO THE NEAREST TENTH OF A SECOND.
13. AFTER THE REQUIREMENTS OF NOTES 8 AND 12 ARE MET, APPLY TORQUE IN A CLOCKWISE DIRECTION TO A FUZE SETTING OF 93.5 TO 94.5.
14. STAMP AS SHOWN INCLUDING MANUFACTURERS LOT NUMBER PER MIL-STD-101C, WITH LETTERS AND NUMBERS 2 HIGH + 0 DEEP CENTRALLY LOCATE MARKINGS BETWEEN WIREN CH FLATE
15. AFTER THE REQUIREMENTS OF NOTE 14 HAVE BEEN PERFORMED, APPLY FINISH 201 OF MIL-STD-17 BLACK NO. 17038, TO AREAS EXPOSED AS A RESULT OF THE APPLICATION OF MARKING OR HANDLING.
16. AFTER THE REQUIREMENTS OF NOTES 13, 14, AND 15 ARE MET, MACHINE (1) 1.025-0.004 DIA HOLE TO LOCATION INDICATED. (RADIAL LOCATION MUST NOT INTERFERE WITH WRENCH FLATS OR MARKING) DIAMETER OF PIN TOOL POINT INCLUDED, MUST NOT BREAK THROUGH INNER WALL OF BODY, BUT MUST INSURE SEATING OF PIN SPRING, TUBULAR COILED, HEAVY DUTY, DWG. 937329, FLUSH OR BELOW INSERT PIN SPRING, FLUSH OR BELOW, AND FILL CAVITY WITH SEALANT. 100% SENSITIVE DWG. 9236736, FLUSH
17. THE REQUIREMENTS OF NOTE 16 MUST BE ACCOMPLISHED ON ALL SAMPLES. IT IS PERMISSIBLE, HOWEVER, TO DEFER THE DRILLING AND PIN INSERTION REQUIREMENTS ON THE REMAINDER OF THE LOT QUANTITY PENDING BALLISTIC TEST RESULTS.

TOP VIEW

DEVELOPED VIEW

FIGURE 6

FIGURE 6

**NOTES:**

- 1 - SPEC. MIL-A-2550 APPLIES.
- 2 - STAKE MUST WITHSTAND AN AXIAL PUSH-OUT FORCE OF 1485 MM IN DIRECTION SHOWN PRIOR TO ASSEMBLY OF CLOSURE DISC.
- 3 - AFTER STAKING, STAKE AND LEAD MUST BE FLUSH OR BELOW SURFACE "X".
- 4 - CLOSURE DISC SHALL BE UNIFORMLY APPLIED AND SHALL EXHIBIT NO EVIDENCE OF BUBBLES OR CREASES.

A diagram showing a wedge being driven into a wooden board. The wedge is shown in cross-section, with its pointed end driving into the wood. A line extends from the tip of the wedge to the text "STAKE OVER 360°".

SEE NOTE 3  
SURFACE 'X'  
DETAIL B  
SCALE 10/1

2-300-12UNS-IA  
[MAJOR DIA]-A-  
REF

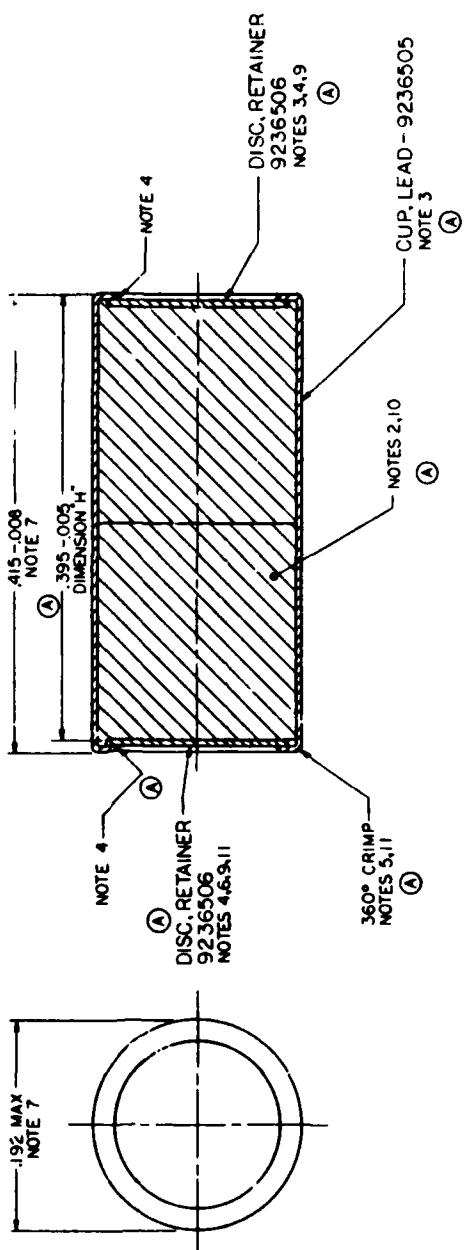
A technical line drawing of a rectangular explosive device. The top portion is a thin, hatched rectangular frame. Inside this frame is a larger, solid rectangular cavity. Below this cavity is a smaller, solid rectangular base plate. The base plate features a central rectangular cutout with a small cross inside. At the bottom of this cutout, there is a small, rectangular component with a protrusion. The entire assembly is mounted on a base with four small, square feet.

-LEND EXPLOSIVE, PASIO -  
9236504 SECTION C-C

SEE SEPARATE PARTS LIST - 9352571

PART NO. 255-27		DATE 05-12-27		REVISION 03		PAGE NO. 1	
NAME OF MANUFACTURER		NAME OF IMPORTER		NAME OF DISTRIBUTOR		NAME OF AGENT	
DOLY		DOLY		DOLY		DOLY	
BODY ASSEMBLY							
ITEM NO.	DESCRIPTION	QTY	UNIT	ITEM NO.	DESCRIPTION	QTY	UNIT
1	1	1	PC	2	1	1	PC
3	1	1	PC	4	1	1	PC
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429							

FIGURE 7



Editorial

⑧ ORIGINAL DESIGN ACTIVITY FSCM NO. 19203

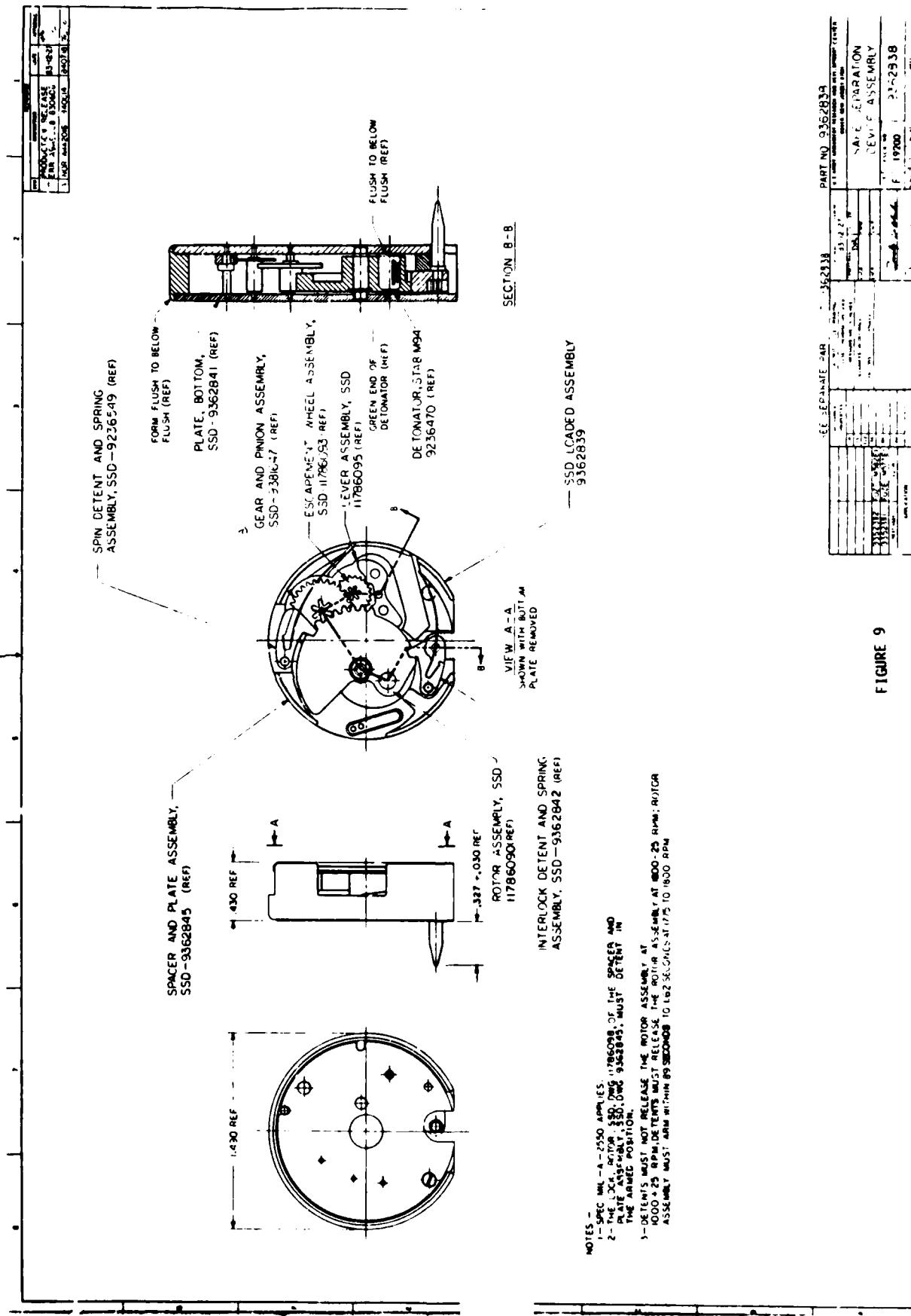


FIGURE 9

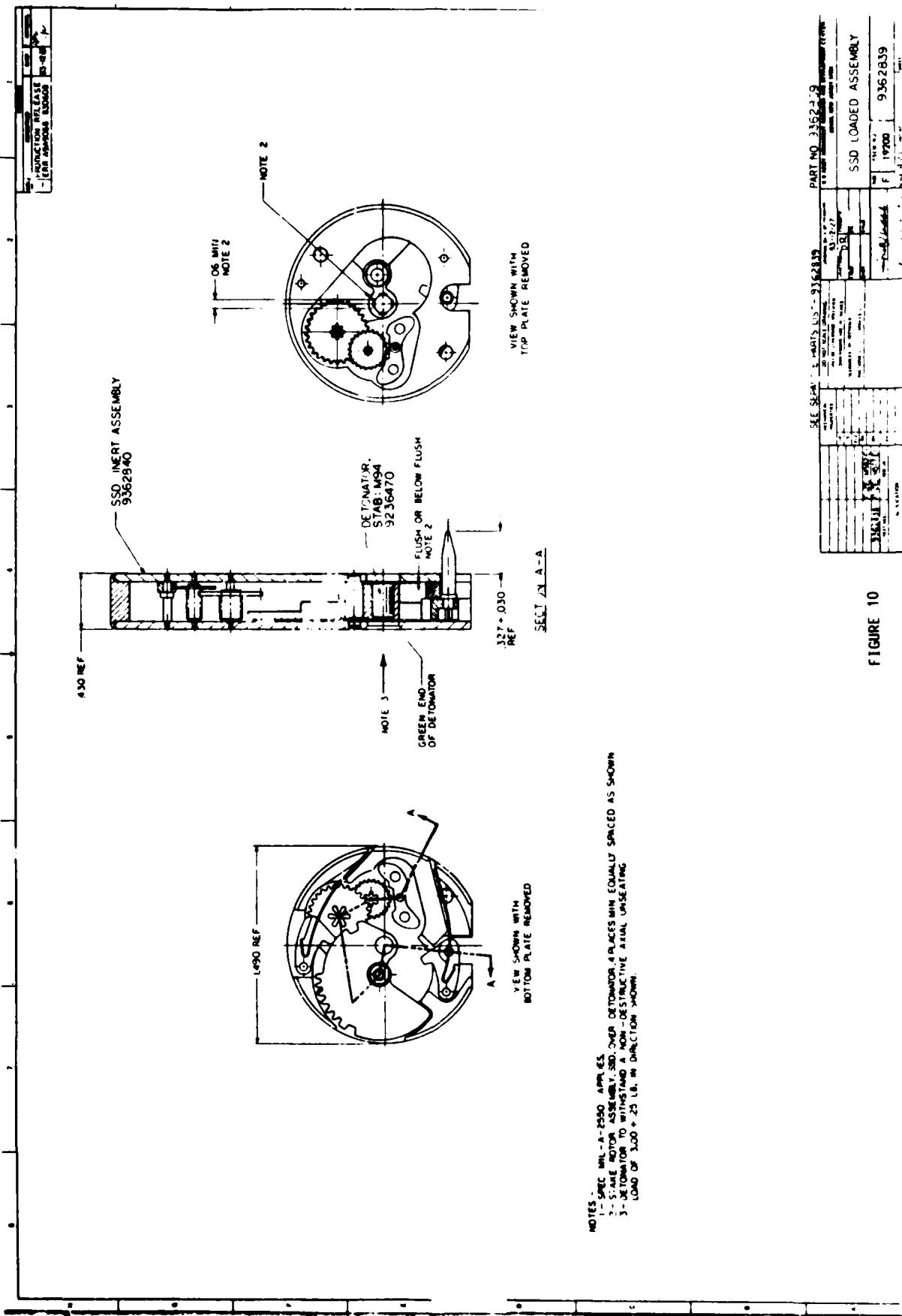


FIGURE 11

AMMUNITION DATA CARD

M582A1 FUZES IN METAL AMMO BOXES WITH NON-PROPAGATING PACK

DEPARTMENT OF DEFENSE AMMUNITION DATA CARD			FORM APPROVED BUDGET BUREAU NO. 22-R0388	LOT NUMBER MA-85E005-001	
ITEM NOMENCLATURE Fuze, MTSQ, M582A1		NOM 1390 01 158 8193-N286		PACKING OF LOT 8 Fuzes/Metal Ammo. Box, M2A1; 2 Metal Ammo. Boxes/Wirebound Box, Dwg. 8861213/AK; 36 Boxes/Pallet (Non Propagating Pack)	
MANUFACTURING, LOADING OR ASSEMBLING ACTIVITY MILAN ARMY AMMUNITION PLANT		NET QUANTITY 10,368			
CONTRACTOR MARTIN MARIETTA ORDNANCE SYSTEMS, INC.	CONTRACT OR ORDER NO. PRON No. F1498279		DRAWING OR REVISION 9352383 (See Note 2)	SPECIFICATION & REVISION See Note 1	
DATE STARTED 5-6-85	DATE COMPLETED 5-7-85		DATE INSPECTED 5-7-85	LINE H	ZONE WT SHELL
CHARGE WEIGHT	EXPECTED MUZZLE VELOCITY		EXPECTED PRESSURE	SHELL WEIGHT	
EXPLOSIVE WT PER PG	INDEX OF POWDER		MPO IN INCHES	PPDR IN INCHES	
NUMBER OF TEST SAMPLES 30	SENT TO Jefferson PG		DATE AND MODE OF SHIPMENT 5-10-85 C/C BTR No. 167-84		
COMPONENTS (CONTINUE ON REVERSE, IF NECESSARY).					
COMPONENT	DRAWING NO.	MODEL	MANUFACTURER	DATE MFG	LOT NO
Fuze, MTSQ Less Booster	9352382	M582A1	Hamilton Tech. Inc	HAT85B016-009	10,398
DISPOSITION ACCEPTED			TYPED NAME OF GOVERNMENT INSPECTOR John E. Barber Jerry Laster		
			SIGNATURE John E. Barber 6/14/85		

DD FORM 1000 1 FEBRUARY 1988

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1.1.14.  $\frac{1}{10} = 12 \cdot \frac{1}{10} = 7 \cdot \frac{9}{10} = 185 \cdot \frac{9}{100} = 185 \cdot 0.09$

THE SET SHALL BE SHIPPED IN ACCORDANCE WITH DNG C0790022.  
THE SET, SHAVING TO BE APPLIED SHALL BE AS PERTINENT - SEC "A".  
THE SPECIFIC IDENTIFICATION OF THE ITEM PACKED SHALL BE AS PERTINENT  
SEE TABLE.  
THE CUBICAL DISAGREEMENT SHALL BE - "10".  
THE HEAVY AND DODGE SHALL BE - SEE TABLE.  
NOTE:-  
NAME NAME NAME NO. LOT NUMBER ON END CLEATS OF BOX. THE WEIGHT OF  
ITEMS SETS AND DODGE SHALL BE DETERMINED AS INDICATED  
IN THE CUBICAL DISAGREEMENT.

LINE NO.	DRAWING NUMBER	WEIGHTS (ESTIMATED)	POUNDS.	
			DATE	DATE
100				
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FOR MAI-1770, MAI PACIFIC PAC, SEE DRAWINGS FOR  
MAI-1770, MAI PACIFIC PAC, FOR ARTILLERY AND SOCIETY PAGES  
SEE DRAWINGS FOR MAI-1770

SEE SEPARATE PARTS LIST 8861213

ART NO. 9861213

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FIGURE 12

FIGURE 13



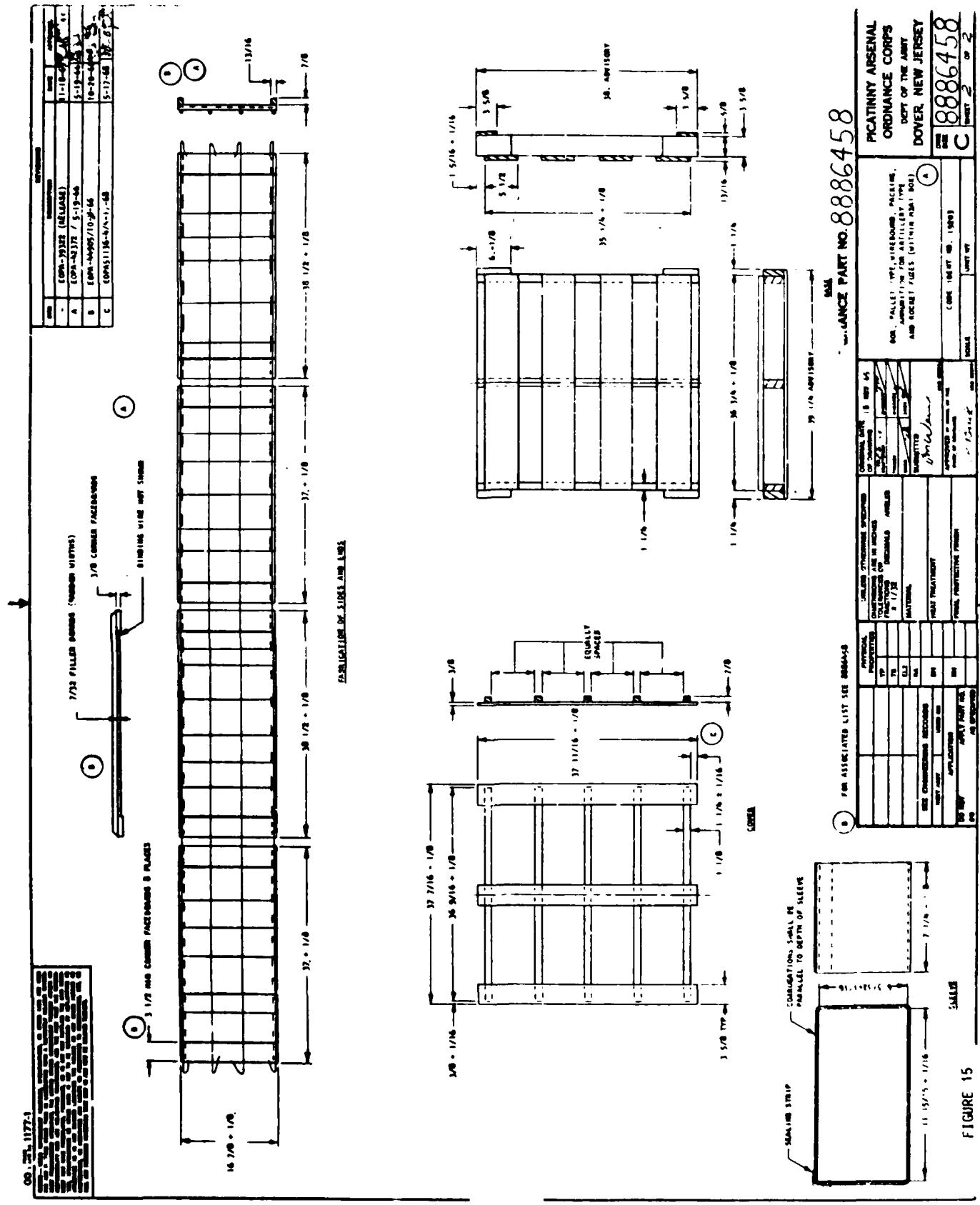
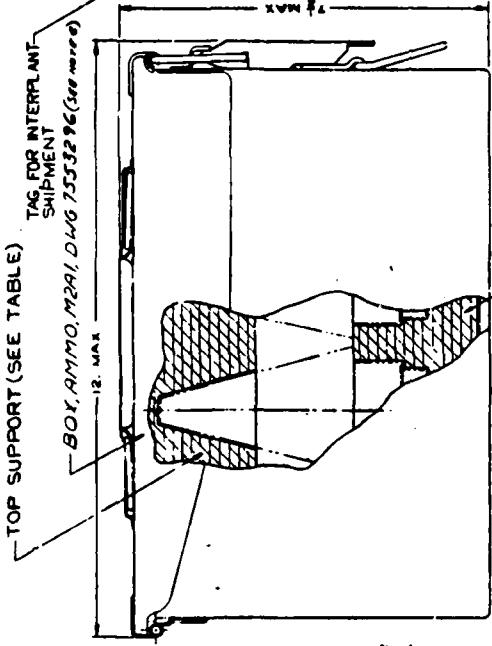


FIGURE 16

TAG FOR INTERPLANT  
SHIPMENT



NOTE 6

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OUTLET 60  
WADDELL, INC.

## TABLE 3. SUPPORT (SEE TABLE 1)

FOR AMMO METAL FOR  
ARTILLERY TYPE AND  
ROCKET MUZES

- 22 -

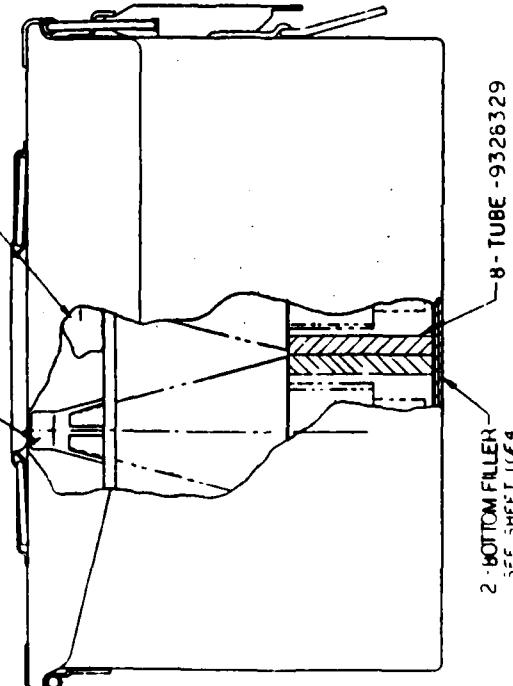
1. DESCRIPTIVE Nomenclature	2. CODE	3. ASSIMILATE	4. TOP SUPPORT	5. BOTTOM SUPPORT	6. ORDNANCE PART NO.
1. a. FUZE M150 M50(A)	21275	8864492-1	37321-1-6	9232-43	
2. b. FUZE M150 M51A	21319	8864492-1	37321-5	9232-43	
3. c. FUZE M150 M51B	21321	8864492-1	37321-2	9232-43	
4. d. FUZE M150 M51C	21323	8864492-1	37321-3	9232-43	
5. e. FUZE M150 M51D	21325	8864492-1	37321-4	9232-43	
6. f. FUZE M150 M51E	21327	8864492-1	37321-5	9232-43	
7. g. FUZE M150 M52(A)	21328	8864492-1	37321-6	9232-43	
8. h. FUZE M150 M52(B)	21329	8864492-1	37321-7	9232-43	
9. i. FUZE M150 M52(C)	21330	8864492-1	37321-8	9232-43	
10. j. FUZE M150 M52(D)	21331	8864492-1	37321-9	9232-43	
11. k. FUZE M150 M52(E)	21332	8864492-1	37321-0	9232-43	
12. l. FUZE M150 M52(F)	21333	8864492-1	37321-1	9232-43	
13. m. FUZE M150 M52(G)	21334	8864492-1	37321-2	9232-43	
14. n. FUZE M150 M52(H)	21335	8864492-1	37321-3	9232-43	
15. o. FUZE M150 M52(I)	21336	8864492-1	37321-4	9232-43	
16. p. FUZE M150 M52(J)	21337	8864492-1	37321-5	9232-43	
17. q. FUZE M150 M52(K)	21338	8864492-1	37321-6	9232-43	
18. r. FUZE M150 M52(L)	21339	8864492-1	37321-7	9232-43	
19. s. FUZE M150 M52(M)	21340	8864492-1	37321-8	9232-43	
20. t. FUZE M150 M52(N)	21341	8864492-1	37321-9	9232-43	
21. u. FUZE M150 M52(O)	21342	8864492-1	37321-0	9232-43	
22. v. FUZE M150 M52(P)	21343	8864492-1	37321-1	9232-43	
23. w. FUZE M150 M52(Q)	21344	8864492-1	37321-2	9232-43	
24. x. FUZE M150 M52(R)	21345	8864492-1	37321-3	9232-43	
25. y. FUZE M150 M52(S)	21346	8864492-1	37321-4	9232-43	
26. z. FUZE M150 M52(T)	21347	8864492-1	37321-5	9232-43	
27. aa. FUZE M150 M52(U)	21348	8864492-1	37321-6	9232-43	
28. bb. FUZE M150 M52(V)	21349	8864492-1	37321-7	9232-43	
29. cc. FUZE M150 M52(W)	21350	8864492-1	37321-8	9232-43	
30. dd. FUZE M150 M52(X)	21351	8864492-1	37321-9	9232-43	
31. ee. FUZE M150 M52(Y)	21352	8864492-1	37321-0	9232-43	
32. ff. FUZE M150 M52(Z)	21353	8864492-1	37321-1	9232-43	
33. gg. FUZE M150 M52(A)	21354	8864492-1	37321-2	9232-43	
34. hh. FUZE M150 M52(B)	21355	8864492-1	37321-3	9232-43	
35. ii. FUZE M150 M52(C)	21356	8864492-1	37321-4	9232-43	
36. jj. FUZE M150 M52(D)	21357	8864492-1	37321-5	9232-43	
37. kk. FUZE M150 M52(E)	21358	8864492-1	37321-6	9232-43	
38. ll. FUZE M150 M52(F)	21359	8864492-1	37321-7	9232-43	
39. mm. FUZE M150 M52(G)	21360	8864492-1	37321-8	9232-43	
40. nn. FUZE M150 M52(H)	21361	8864492-1	37321-9	9232-43	
41. oo. FUZE M150 M52(I)	21362	8864492-1	37321-0	9232-43	
42. pp. FUZE M150 M52(J)	21363	8864492-1	37321-1	9232-43	
43. qq. FUZE M150 M52(K)	21364	8864492-1	37321-2	9232-43	
44. rr. FUZE M150 M52(L)	21365	8864492-1	37321-3	9232-43	
45. ss. FUZE M150 M52(M)	21366	8864492-1	37321-4	9232-43	
46. tt. FUZE M150 M52(N)	21367	8864492-1	37321-5	9232-43	
47. uu. FUZE M150 M52(O)	21368	8864492-1	37321-6	9232-43	
48. vv. FUZE M150 M52(P)	21369	8864492-1	37321-7	9232-43	
49. ww. FUZE M150 M52(Q)	21370	8864492-1	37321-8	9232-43	
50. xx. FUZE M150 M52(R)	21371	8864492-1	37321-9	9232-43	
51. yy. FUZE M150 M52(S)	21372	8864492-1	37321-0	9232-43	
52. zz. FUZE M150 M52(T)	21373	8864492-1	37321-1	9232-43	
53. aa. FUZE M150 M52(U)	21374	8864492-1	37321-2	9232-43	
54. bb. FUZE M150 M52(V)	21375	8864492-1	37321-3	9232-43	
55. cc. FUZE M150 M52(W)	21376	8864492-1	37321-4	9232-43	
56. dd. FUZE M150 M52(X)	21377	8864492-1	37321-5	9232-43	
57. ee. FUZE M150 M52(Y)	21378	8864492-1	37321-6	9232-43	
58. ff. FUZE M150 M52(Z)	21379	8864492-1	37321-7	9232-43	
59. gg. FUZE M150 M52(A)	21380	8864492-1	37321-8	9232-43	
60. hh. FUZE M150 M52(B)	21381	8864492-1	37321-9	9232-43	
61. ii. FUZE M150 M52(C)	21382	8864492-1	37321-0	9232-43	
62. jj. FUZE M150 M52(D)	21383	8864492-1	37321-1	9232-43	
63. kk. FUZE M150 M52(E)	21384	8864492-1	37321-2	9232-43	
64. ll. FUZE M150 M52(F)	21385	8864492-1	37321-3	9232-43	
65. mm. FUZE M150 M52(G)	21386	8864492-1	37321-4	9232-43	
66. nn. FUZE M150 M52(H)	21387	8864492-1	37321-5	9232-43	
67. oo. FUZE M150 M52(I)	21388	8864492-1	37321-6	9232-43	
68. pp. FUZE M150 M52(J)	21389	8864492-1	37321-7	9232-43	
69. qq. FUZE M150 M52(K)	21390	8864492-1	37321-8	9232-43	
70. rr. FUZE M150 M52(L)	21391	8864492-1	37321-9	9232-43	
71. ss. FUZE M150 M52(M)	21392	8864492-1	37321-0	9232-43	
72. tt. FUZE M150 M52(N)	21393	8864492-1	37321-1	9232-43	
73. uu. FUZE M150 M52(O)	21394	8864492-1	37321-2	9232-43	
74. vv. FUZE M150 M52(P)	21395	8864492-1	37321-3	9232-43	
75. ww. FUZE M150 M52(Q)	21396	8864492-1	37321-4	9232-43	
76. xx. FUZE M150 M52(R)	21397	8864492-1	37321-5	9232-43	
77. yy. FUZE M150 M52(S)	21398	8864492-1	37321-6	9232-43	
78. zz. FUZE M150 M52(T)	21399	8864492-1	37321-7	9232-43	
79. aa. FUZE M150 M52(U)	21400	8864492-1	37321-8	9232-43	
80. bb. FUZE M150 M52(V)	21401	8864492-1	37321-9	9232-43	
81. cc. FUZE M150 M52(W)	21402	8864492-1	37321-0	9232-43	
82. dd. FUZE M150 M52(X)	21403	8864492-1	37321-1	9232-43	
83. ee. FUZE M150 M52(Y)	21404	8864492-1	37321-2	9232-43	
84. ff. FUZE M150 M52(Z)	21405	8864492-1	37321-3	9232-43	
85. gg. FUZE M150 M52(A)	21406	8864492-1	37321-4	9232-43	
86. hh. FUZE M150 M52(B)	21407	8864492-1	37321-5	9232-43	
87. ii. FUZE M150 M52(C)	21408	8864492-1	37321-6	9232-43	
88. jj. FUZE M150 M52(D)	21409	8864492-1	37321-7	9232-43	
89. kk. FUZE M150 M52(E)	21410	8864492-1	37321-8	9232-43	
90. ll. FUZE M150 M52(F)	21411	8864492-1	37321-9	9232-43	
91. mm. FUZE M150 M52(G)	21412	8864492-1	37321-0	9232-43	
92. nn. FUZE M150 M52(H)	21413	8864492-1	37321-1	9232-43	
93. oo. FUZE M150 M52(I)	21414	8864492-1	37321-2	9232-43	
94. pp. FUZE M150 M52(J)	21415	8864492-1	37321-3	9232-43	
95. qq. FUZE M150 M52(K)	21416	8864492-1	37321-4	9232-43	
96. rr. FUZE M150 M52(L)	21417	8864492-1	37321-5	9232-43	
97. ss. FUZE M150 M52(M)	21418	8864492-1	37321-6	9232-43	
98. tt. FUZE M150 M52(N)	21419	8864492-1	37321-7	9232-43	
99. uu. FUZE M150 M52(O)	21420	8864492-1	37321-8	9232-43	
100. vv. FUZE M150 M52(P)	21421	8864492-1	37321-9	9232-43	
101. xx. FUZE M150 M52(Q)	21422	8864492-1	37321-0	9232-43	
102. yy. FUZE M150 M52(R)	21423	8864492-1	37321-1	9232-43	
103. zz. FUZE M150 M52(S)	21424	8864492-1	37321-2	9232-43	
104. aa. FUZE M150 M52(T)	21425	8864492-1	37321-3	9232-43	
105. bb. FUZE M150 M52(U)	21426	8864492-1	37321-4	9232-43	
106. cc. FUZE M150 M52(V)	21427	8864492-1	37321-5	9232-43	
107. dd. FUZE M150 M52(W)	21428	8864492-1	37321-6	9232-43	
108. ee. FUZE M150 M52(X)	21429	8864492-1	37321-7	9232-43	
109. ff. FUZE M150 M52(Y)	21430	8864492-1	37321-8	9232-43	
110. gg. FUZE M150 M52(Z)	21431	8864492-1	37321-9	9232-43	
111. hh. FUZE M150 M52(A)	21432	8864492-1	37321-0	9232-43	
112. ii. FUZE M150 M52(B)	21433	8864492-1	37321-1	9232-43	
113. jj. FUZE M150 M52(C)	21434	8864492-1	37321-2	9232-43	
114. kk. FUZE M150 M52(D)	21435	8864492-1	37321-3	9232-43	
115. ll. FUZE M150 M52(E)	21436	8864492-1	37321-4	9232-43	
116. mm. FUZE M150 M52(F)	21437	8864492-1	37321-5	9232-43	
117. nn. FUZE M150 M52(G)	21438	8864492-1	37321-6	9232-43	
118. oo. FUZE M150 M52(H)	21439	8864492-1	37321-7	9232-43	
119. pp. FUZE M150 M52(I)	21440	8864492-1	37321-8	9232-43	
120. qq. FUZE M150 M52(J)	21441	8864492-1	37321-9	9232-43	
121. rr. FUZE M150 M52(K)	21442	8864492-1	37321-0	9232-43	
122. ss. FUZE M150 M52(L)	21443	8864492-1	37321-1	9232-43	
123. tt. FUZE M150 M52(M)	21444	8864492-1	37321-2	9232-43	
124. uu. FUZE M150 M52(N)	21445	8864492-1	37321-3	9232-43	
125. vv. FUZE M150 M52(O)	21446	8864492-1	37321-4	9232-43	
126. ww. FUZE M150 M52(P)	21447	8864492-1	37321-5	9232-43	
127. xx. FUZE M150 M52(Q)	21448	8864492-1	37321-6	9232-43	
128. yy. FUZE M150 M52(R)	21449	8864492-1	37321-7	9232-43	
129. zz. FUZE M150 M52(S)	21450	8864492-1	37321-8	9232-43	
130. aa. FUZE M150 M52(T)	21451	8864492-1	37321-9	9232-43	
131. bb. FUZE M150 M52(U)	21452	8864492-1	37321-0	9232-43	
132. cc. FUZE M150 M52(V)	21453	8864492-1	37321-1	9232-43	
133. dd. FUZE M150 M52(W)	21454	8864492-1	37321-2	9232-43	
134. ee. FUZE M150 M52(X)	21455	8864492-1	37321-3	9232-43	
135. ff. FUZE M150 M52(Y)	21456	8864492-1	37321-4	9232-43	
136. gg. FUZE M150 M52(Z)	21457	8864492-1	37321-5	9232-43	
137. hh. FUZE M150 M52(A)	21458	8864492-1	37321-6	9232-43	
138. ii. FUZE M150 M52(B)	21459	8864492-1	37321-7	9232-43	
139. jj. FUZE M150 M52(C)	21460	8864492-1	37321-8	9232-43	
140. kk. FUZE M150 M52(D)	21461	8864492-1	37321-9	9232-43	
141. ll. FUZE M150 M52(E)	21462	8864492-1	37321-0	9232-43	
142. mm. FUZE M150 M52(F)	21463	8864492-1	37321-1	9232-43	
143. nn. FUZE M150 M52(G)	21464	8864492-1	37321-2	9232-43	



REF	DESCRIPTION	QTY
1	NON-PROPAGATION FACK ASSY	1
2	NON-PROPAGATION FACK ASSY	1
3	NON-PROPAGATION FACK ASSY	1
4	NON-PROPAGATION FACK ASSY	1

SUPPORT TOP  
SEE TABLE 2 ON SHEET 2

-DESICCANT  
SEE SHEET 3



PACKING INSTRUCTIONS FOR NON-PROPAGATION FACK ASSY

P1- ALL PARTS IN SHELL, BE THOROUGHLY DRY AT TIME OF PACKING. INERT STUCCO CONTENT OF PAPER PRODUCTS TO BE USED AS BACKING.

P2- ALL INERT STUCCO SHELLS AND PLATES SHALL BE VIBRALLY INSPECTED AT TIME OF PACKING TO ASSURE THAT THERE IS NO CONSIDERABLE MARGIN SURFACE DEFECTS.

P3- PLACE 8 TUBE PLATES, ONE ON TOP THE OTHER, ON SHELL BOTTOM ON EACH SIDE OF SHELL INCERTION. INSERT 8 TUBES IN A LINE PATTERN. PLACE 8 PLATES WITH INSERTION OPENINGS AND WITH BOTTOM INSIDE THE SHELL.

P4- PLACE TOP SUPPORT, SEE SHEET 4 ON PLATES.

P5- PLACE DESICCANT ON TOP OF CENTER PARTITION OR TOP SUPPORT IN LENGTH OF SHELL BOTTOM OR OF SUPPORT (SEE SHEET 2).

P6- BOTTOM PLATES, IF REQUIRED, SHALL BE ADDED ON BOTTOM OF SHELL ON EACH SIDE OF SHELL INCERTION TO INHIBIT 8-TUBE PACKING.

P7- CLOSE AND SEAL CONTAINER. THE CONTAINER SHALL SUSTAIN AN AIR LEAKAGE TEST. SEE SHEET 1 OR 4 OF THIS DRAWING FOR TEST REQUIREMENTS.

PART NO. 9964492	
1	NON-PROPAGATION FACK ASSY
2	NON-PROPAGATION FACK ASSY
3	NON-PROPAGATION FACK ASSY
4	NON-PROPAGATION FACK ASSY

1. SEE SHEET 1 (C4)  
2. SEE SHEET 2 (C4)  
3. SEE SHEET 3 (C4)  
4. SEE SHEET 4 (C4)

FIGURE 19

NON-PROPAGATION FACK ASSY  
SEE SHEET 1 (C4)

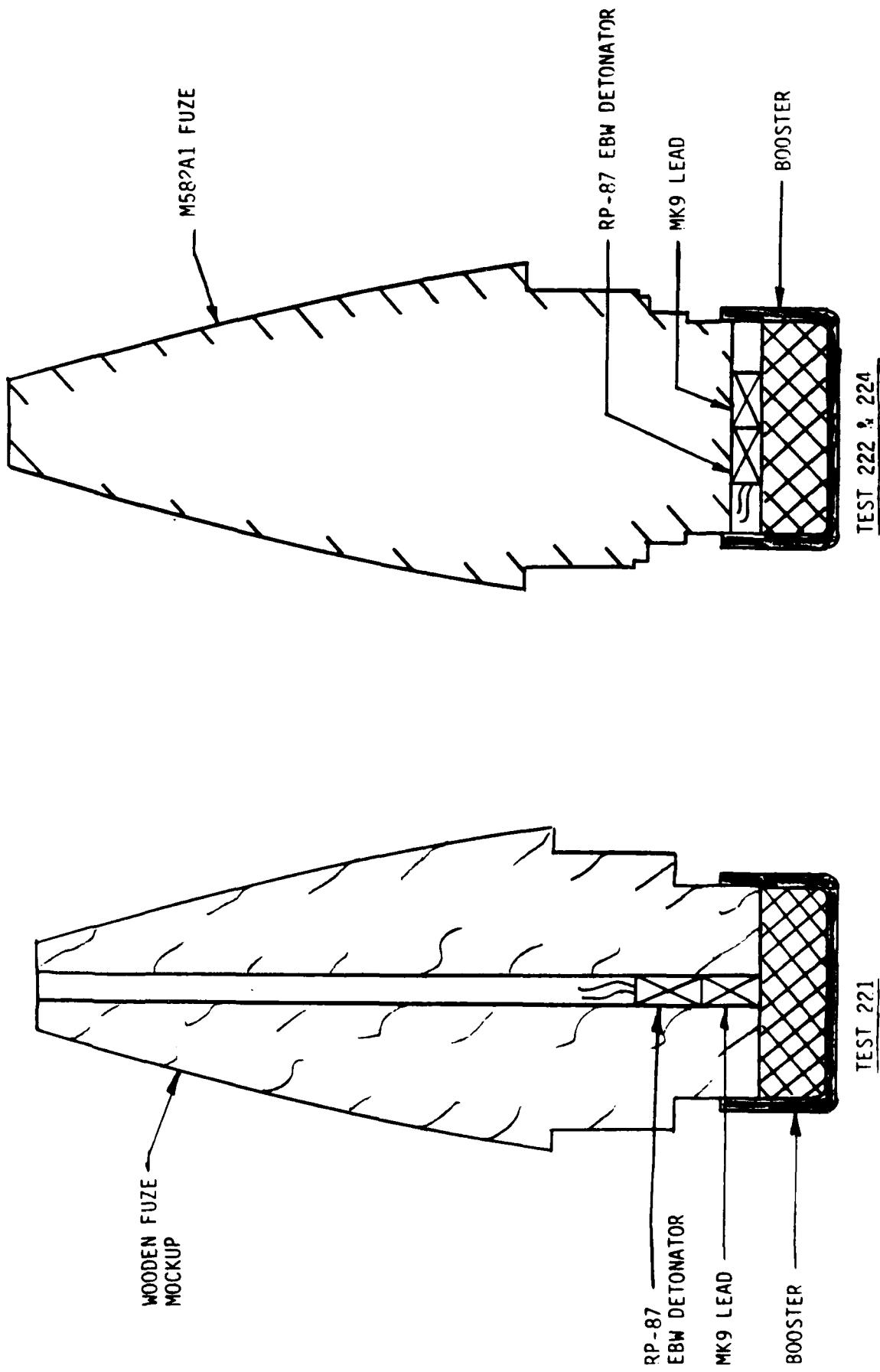


FIGURE 20- INITIATION METHOD SINGLE TACK TESTS

PACKAGED WITH DESICCANT  
**DO NOT OPEN**  
UNTIL READY FOR USE OR INSPECTION

HAZARD  
CLASSIFICATION  
SINGLE PACK TEST  
221  
OCTOBER 30 1985

FIGURE 21

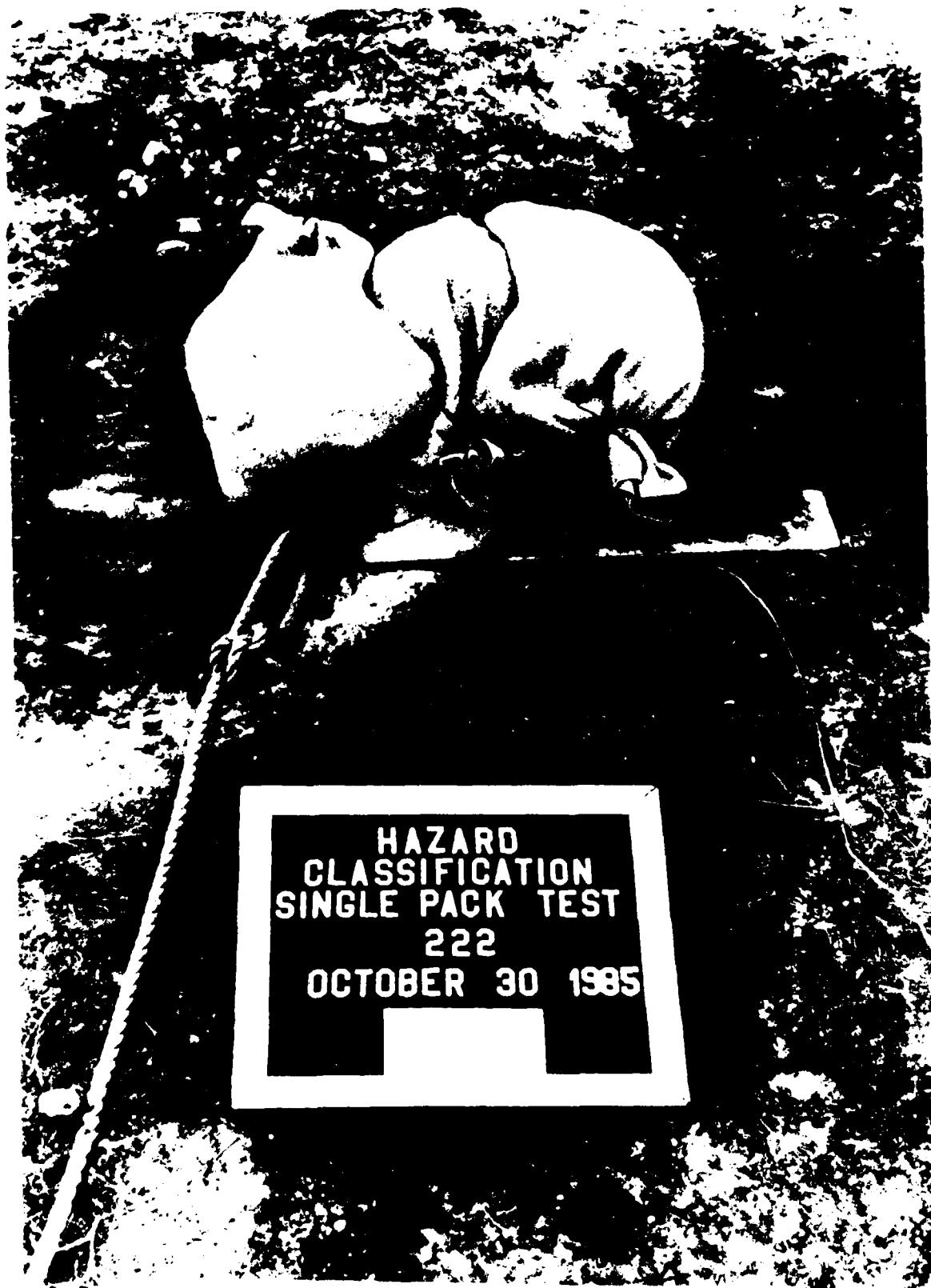


FIGURE 22  
STEEL PLATE AND SAND ARE COMING DOWN



FIGURE 23  
POST TEST RESULTS - TEST 221



FIGURE 24  
CRUSHING OF BOOSTERS - TEST 221



FIGURE 25  
POST TEST RESULTS - TEST 222

PACKAGED WITH DESICCANT  
DO NOT OPEN  
UNTIL READY FOR USE OR INSPECTION

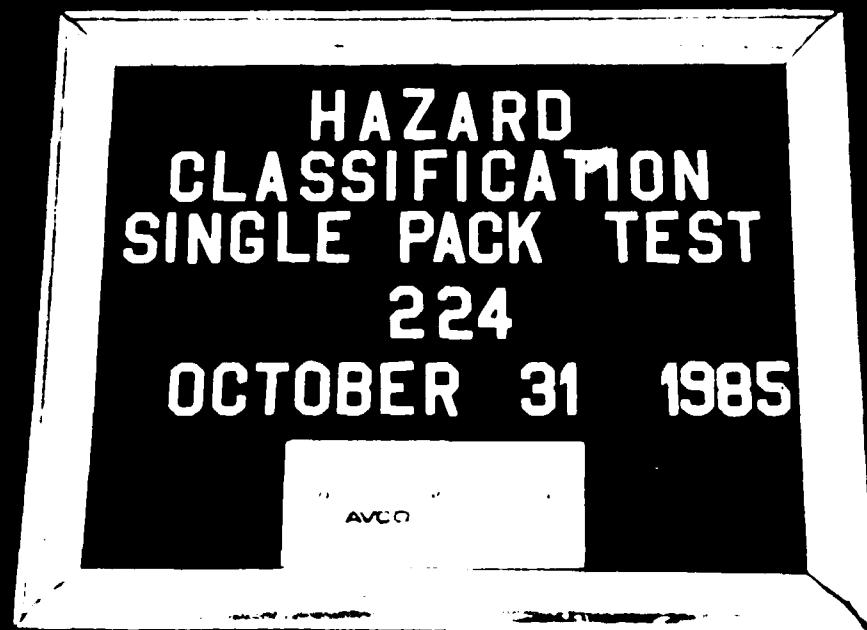


FIGURE 26  
TEST SETUP - TEST 224



FIGURE 27  
POST TEST RESULTS - TEST 224

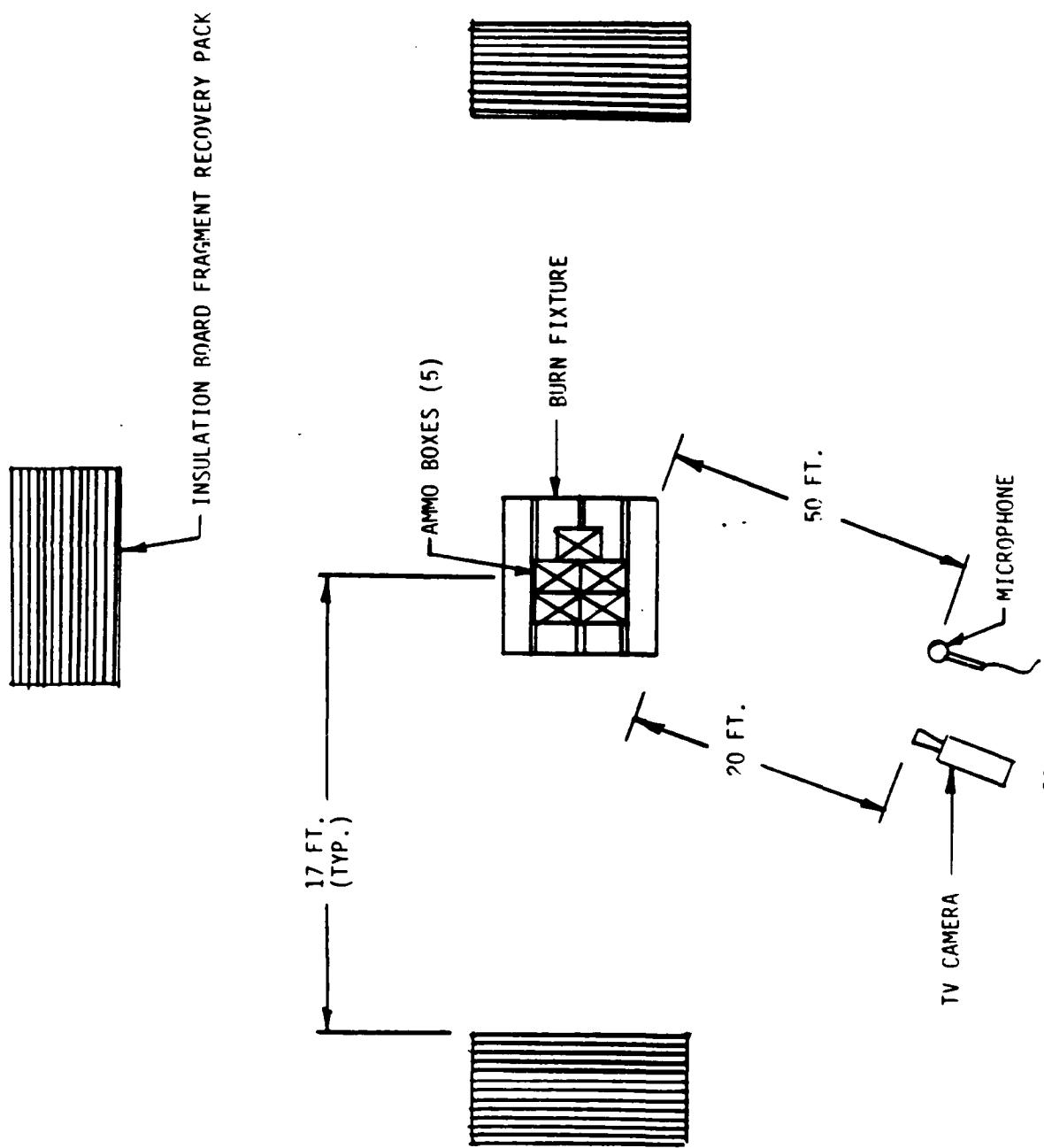


FIGURE 28 - SCHEMATIC OF TEST SETUP, EXTERNAL FIRE STACK TESTS

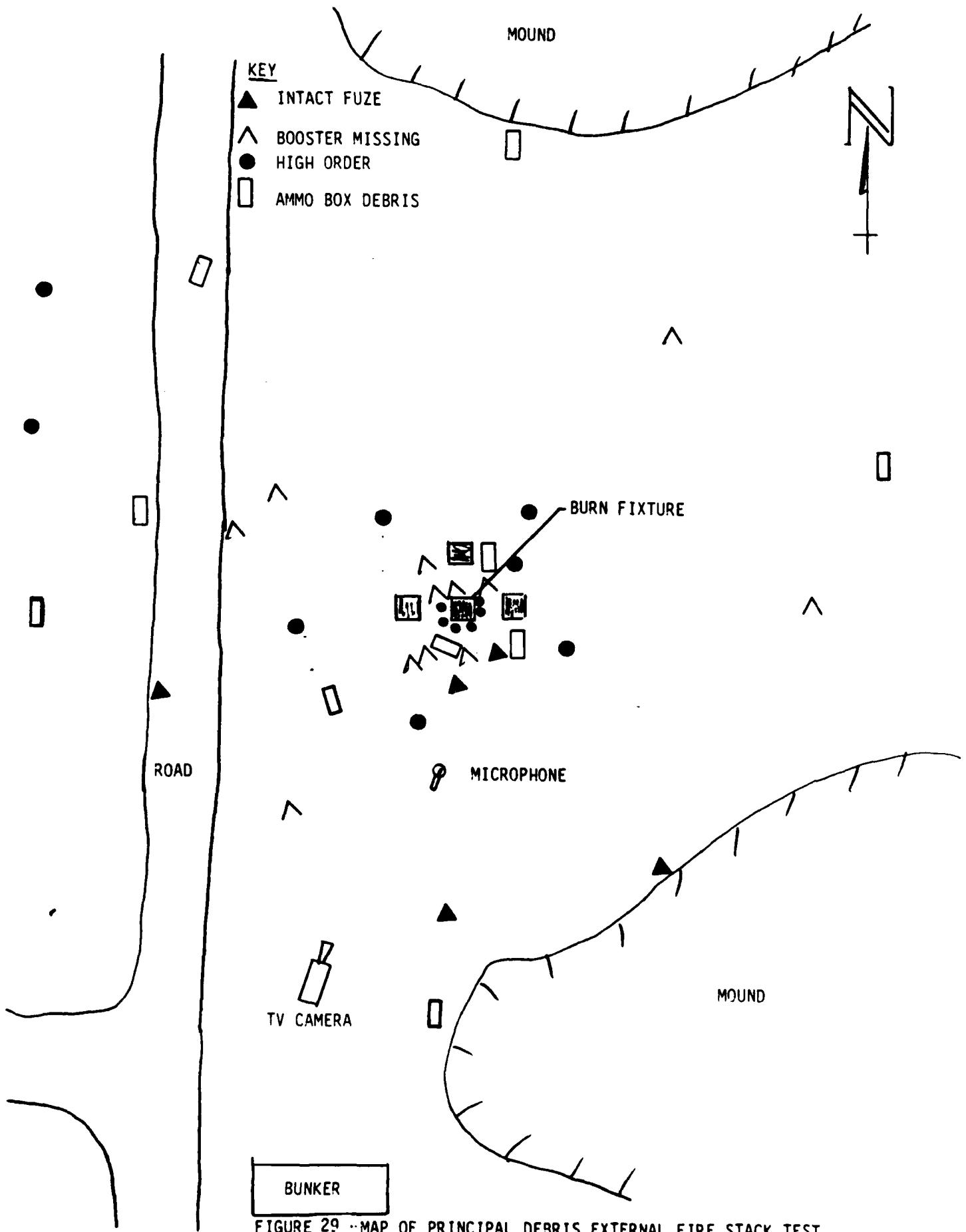


FIGURE 29 - MAP OF PRINCIPAL DEBRIS, EXTERNAL FIRE STACK TEST

FILE # 30  
WIND BREAK SET 10 NO. 1000 FIXTURE

HAZARD  
CLASSIFICATION  
EXTERNAL FIRE TEST  
223  
OCTOBER 30 1985



FIGURE 31  
BUILD FIXTURE WITH KINDELINE HOOD IN PLACE



FIGURE 32  
BURN FIXTURE AND FRAGMENT RECOVERY PACKS



FIGURE 23

GENERAL VIEW OF TEST AREA FOLLOWING CONDUCT OF FIRE STACK TEST



FIGURE 34

FUSE AND KITLING DEEPIS IN BUPM PIT



FIGURE 35  
FUZE AND KINDLING DEBRIS IN BURN PIT



FIGURE 3C  
EJECTED FUZE - TEST 223



FIGURE 37  
DEFUSED FUZE - TEST 223

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